

What is claimed is:

- 1 1. An apparatus comprising:
2 an embossable substrate mixture that includes a polymer and a release agent.
- 1 2. The apparatus of claim 1, further including:
2 a substrate base, wherein the embossable substrate mixture is a film over the
3 substrate base and is embossed.
- 1 3. The apparatus of claim 2, wherein the embossable substrate mixture is a film
2 over a Mylar film that is attached to the substrate base.
- 1 4. The apparatus of claim 1, wherein the embossable substrate mixture polymer
2 comprises:
3 an epoxy resin; and
4 a hardening agent.
- 1 5. The apparatus of claim 4, wherein the release agent comprises carnauba wax.
- 1 6. The apparatus of claim 5, further comprising:
2 metal wiring deposited in embossed grooves of the embossable substrate
3 mixture;
4 one or more electronic chips coupled to the metal wiring; and
5 one or more external electrical connections coupled to the metal wiring.
- 1 7. The apparatus of claim 6, wherein the one or more electronic chips attached
2 to the metal wiring includes a computer processor; the apparatus further comprising:
3 a memory operatively coupled to the processor;
4 an input system and an output system operatively coupled to the processor;
5 a power supply operatively coupled to the processor; and

6 an enclosure holding the processor, the memory, the input system, the output
7 system, and the power supply.

1 8. The apparatus of claim 1, wherein the release agent comprises one or more
2 components selected from the group consisting of montanic acid, stearic acid,
3 myristic acid, and combinations thereof.

1 9. The apparatus of claim 1, wherein the release agent comprises one or more
2 components selected from the group consisting of fatty acid glycol esters,
3 polyethylene glycol esters, laurate ester and combinations thereof.

1 10. The apparatus of claim 1, wherein the release agent comprises one or more
2 components selected from the group consisting of microcrystalline wax, urethanized
3 microcrystalline wax and oxidized microcrystalline wax and combinations thereof.

1 11. The apparatus of claim 1, wherein the release agent comprises one or more
2 components selected from the group consisting of polyethylene waxes, urethanized
3 polyethylene and oxidized polyethylene wax and combinations thereof.

1 12. The apparatus of claim 1, wherein the release agent comprises one or more
2 components selected from the group consisting of low-molecular-weight branched
3 polyethylene, oxidized low-molecular-weight branched polyethylene, silicone, amino
4 functional polydimethylsiloxanes, and combinations thereof.

1 13. The apparatus of claim 1, wherein the substrate mixture comprises:
2 methyl ethyl ketone;
3 diglycidyl Bisphenol-A;
4 tetrabromo Bisphenol-A;
5 ortho-cresol novolak epoxy resin;
6 epoxy-terminated polybutadiene rubber;

7 brominated phenolic novolak resin;
8 2,4-diamino-6-(2-methyl-1-imadizolyethyl)-1,3,5-triazine.isocyanuric acid adduct;
9 silica; and
10 carnauba wax.

1 14. The apparatus of claim 1, wherein the substrate mixture has a composition
2 ratio of approximately:
3 210 parts of methyl ethyl ketone;
4 20 parts of diglycidyl Bisphenol-A;
5 20 parts of tetrabromo Bisphenol-A;
6 20 parts of ortho-cresol novolak epoxy resin (215 g/eq);
7 15 parts of epoxy-terminated polybutadiene rubber;
8 50 parts of brominated phenolic novolak resin;
9 4 parts of 2,4-diamino-6-(2-methyl-1-imadizolyethyl)-1,3,5-triazine.isocyanuric
10 acid adduct;
11 11 parts of silica (maximum particle size of 5 microns); and
12 1 part of carnauba wax.

1 15. The apparatus of claim 14, further comprising:
2 metal wiring deposited in embossed grooves of the embossable substrate
3 mixture;
4 one or more electronic chips coupled to the metal wiring, wherein the one or
5 more electronic chips form a computer processor;
6 one or more external electrical connections coupled to the metal wiring;
7 a memory operatively coupled to the processor;
8 an input system and an output system operatively coupled to the processor;
9 a power supply operatively coupled to the processor; and
10 an enclosure holding the processor, the memory, the input system, the output
11 system, and the power supply.

- 1 16. A method comprising:
2 providing a substrate base; and
3 depositing a film of an embossable mixture that includes a polymer and a
4 release agent over the substrate base.
- 1 17. The method of claim 16, wherein the depositing of the film includes forming
2 a layer of the embossable mixture over a Mylar film, and attaching the Mylar film to
3 the substrate base.
- 1 18. The method of claim 16, wherein the providing of the embossable mixture
2 comprises:
3 mixing an epoxy resin and a hardening agent with the release agent.
- 1 19. The method of claim 18, wherein the release agent comprises carnauba wax.
- 1 20. The method of claim 19, further comprising:
2 embossing a plurality of grooves into the embossable mixture layer;
3 depositing metal into the embossed grooves;
4 removing excess metal to leave wiring traces;
5 coupling one or more electronic chips to the metal wiring; and
6 coupling one or more external electrical connections to the metal wiring.
- 1 21. An apparatus comprising:
2 a substrate base; and
3 means attached to the substrate base for providing an embossable surface
4 with reduced adherence properties to an embossing tool.
- 1 22. The apparatus of claim 21, wherein the means for providing the embossable
2 surface includes a polymer film having attached thereto means for releasing the
3 embossing tool mixed with an epoxy resin.

1 23. The apparatus of claim 22, wherein the means for releasing the embossing
2 tool comprises carnauba wax.

1 24. The apparatus of claim 23, wherein the means attached to the substrate base
2 for providing the embossable surface is embossed, wherein the apparatus further
3 comprises:

4 metal wiring deposited in embossed grooves of the embossable surface;
5 one or more electronic chips coupled to the metal wiring, wherein the one or
6 more electronic chips form a computer processor;
7 one or more external electrical connections coupled to the metal wiring;
8 a memory operatively coupled to the processor;
9 an input system and an output system operatively coupled to the processor;
10 a power supply operatively coupled to the processor; and
11 an enclosure holding the processor, the memory, the input system, the output
12 system, and the power supply.

1 25. A method comprising:
2 providing a substrate having a surface film of an embossable mixture that
3 includes a polymer and a release agent on the substrate base;
4 embossing a plurality of grooves into the embossable mixture layer;
5 depositing metal into the embossed grooves; and
6 removing excess metal to leave wiring traces.

1 26. The method of claim 25, wherein the providing of the substrate includes
2 providing a substrate base and a surface layer of embossable mixture on a Mylar
3 film, and attaching the Mylar film to the substrate base.

1 27. The method of claim 26, wherein the providing of the surface layer of the
2 embossable mixture comprises mixing an epoxy resin and a hardening agent with the
3 release agent.

1 28. The method of claim 27, wherein the release agent comprises carnauba wax.